DOCKET NUMBER: CH920000087US1

1   LISTING OF THE CLAIMS

2   Claims:

3   What is claimed, is:

4   1. (currently amended) A method for multilevel data communication comprising:
5   dividing a set of information bits to be transmitted into a first group and a second group;
6   encoding the first group to generate a block code ;
7   selecting a subset of symbols in a constellation of symbols in dependence on the block code
8   according to a Gray-coded mapping function;
9   selecting a symbol within the subset in dependence on the second group according to a
10   Gray-coded mapping function; and transmitting the selected symbol, wherein the encoding
11   comprises array coding the first group to generate an array code.

12   2. (original) A method as claimed in claim 1, wherein the encoding comprises LDPC coding the
13   first group to generate an LDPC code.

14   3. (canceled)

15   4. (original) A method as claimed in claim 1, wherein the first group comprises least significant
16   bits of the set of information bits and the second group comprises most significant bits of the set
17   of information bits.

18   5. (original) A method as claimed in claim 1, wherein the first group comprises most significant
19   bits of the set of information bits and the second group comprises least significant bits of the set
20   of information bits.

Application/Control Number: 10/045,810   4/11

DOCKET NUMBER: CH920000087US1

1   6. (original) A method as claimed in claim 1, further comprising receiving the selected symbol
2   and recovering the set of information bits from the selected symbol.

3   7. (original) A method as claimed in claim 6, wherein the recovering of the set of information
4   bits comprises soft demapping the received symbol to generate a probability for each of the bits
5   represented in the symbol to have a particular value and decoding the received symbol to
6   recover the set of information bits in dependence on the probabilities generated by the soft
7   demapping and the received symbol.

8   8. (currently amended) An apparatus for multilevel data communication, the apparatus
9   comprising:
10   a divider for dividing a set of information bits to be transmitted into a first group and a second
11   group;
12   a block encoder connected to the divider for encoding the first group to generate a block code;
13   and,
14   a symbol mapper connected to the divider and the block encoder for selecting a subset of
15   symbols in a constellation of symbols in dependence on the block code according to a
16   Gray-coded mapping function, selecting a symbol within the subset in dependence on the second
17   group according to a Gray-coded mapping function, and transmitting the selected symbol, further
18   comprising a receiver for receiving the selected symbol and recovering the set of information bits
19   from the selected symbol.

20   9. (original) Apparatus as claimed in claim 8, wherein the encoder comprises an LDPC encoder
21   for coding the first group to generate an LDPC code.

22   10. (currently amended) A method An apparatus as claimed in claim 8, wherein the encoding
23   comprises array coding the first group to generate an array code.

24   11. (original) Apparatus as claimed in claim 8, wherein the first group comprises least significant
25   bits of the set of information bits and the second group comprises most significant bits of the set
26   of information bits.

DOCKET NUMBER: CH920000087US1

1   12.   Apparatus as claimed in claim 8, wherein the first group comprises most significant bits

2   of the set of information bits and the second group comprises least significant bits of the set of

3   information bits.

4   13. (canceled)

5   14. (original) Apparatus as claimed in claim 13 wherein the receiver comprises: a soft demapper

6   for demapping the received symbol to generate a probability for each of the bits represented in

7   the symbol to have a particular value and a decoder for decoding the received symbol to recover

8   the set of information bits in dependence on the probabilities generated by the soft demapping

9   and the received symbol.

10   15. (original) A communications device comprising an information source for generating a set of

11   information bits and apparatus for multilevel data transmission as claimed in claim 8   connected

12   to the information source for transmitting the set of the information bits.

13   16. (original) An article of manufacture comprising a computer usable medium having computer

14   readable program code means embodied therein for causing multilevel data communication the

15   computer readable program code means in said article of manufacture comprising computer

16   readable program code means for causing a computer to effect the steps of claim 1.

17   17. (original) A program storage device readable by machine, tangibly embodying a program of

18   instructions executable by the machine to perform method steps for multilevel data

19   communication, said method steps comprising the steps of claim 1.

20   18. (original) A computer program product comprising a computer usable medium having

21   computer readable program code means embodied therein for causing multilevel data

22   communication, the computer readable program code means in said computer program product

23   comprising computer readable program code means for causing a computer to effect the

24   functions of claim 8.